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Insect Control, D-3

1918

REPORT ON INSECT INFESTATION IN ARIZONA AND NEW MEXICO.

Arriving in Flagstaff, Arizona, on June 18, I inspected the various timber sales and areas of infestation in the northern Coconino with Mr. Pearson of the Fort Valley Experiment Station, giving particular attention to the virgin stands as well as cutover areas and to the various problems connected with tree planting. The Saginaw Sale area on the Tusayan was also inspected. On June 24 I went over the comparatively new sale to the Flagstaff Lumber Company, near Lake Mary, with Ranger Lessel, leaving on June 25 for the Prescott Forest where the infestation on the Copper Basin Road was inspected with Deputy Supervisor McNelty and Ranger Nichols. On June 28 in company with Ranger Fletcher I viewed the infestation at Crown King, resulting from the large fire of 1916.

Arriving in Albuquerque July 1, I spent the next ten days on the Santa Fe Forest with Mr. Chapman and Supervisor Kircher, principally on the Santa Barbara Tie and Pole Company's sales where the infestation was extensive in both western yellow pine and Engelman

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spruce, finally returning to Albuquerque by way of Taos where Supervisor Barker reported considerable infestation in various portions of the Carson principally in Garrapata Canyon eighteen miles north of Taos; July 17 to 29 inclusive was occupied by a trip to the Durango Forest in District 2. Returning to Albuquerque on July 30, I proceeded to the Lincoln Forest inspecting the Cloudcroft area, returning by the southern route to California where I arrived in San Francisco, August 14, 1918.

Infestations.

I was considerably surprised at the extent of the infestations in District 3, especially in northern New Mexico. The loss from insect infestation in Arizona was much like that of California, a comparatively steady yearly toll, varied by sporadic outbreaks caused by the multiplication of injurious bark beetles bred in slash and cull logs. Such was the outbreak of 1916 at Jacksmith Tank near Flagstaff. In general the situation in northern Arizona seemed to be as follows:

1. Virgin timber contiguous to old cuttings was generally infested, the bark beetles taking a yearly toll of ten to fifteen trees to the section.

2. Virgin timber not contiguous to old cuttings was almost free from infestation.

3. The killing of reproduction by what are ordinarily considered secondary bark borers was considerable. This killing almost invariably occurred around fresh slash.

4. Cutover areas are sustaining a steady loss of seed trees from insect infestation.

5. Plantations were heavily attacked by June Beetles and Tip Moths.

As northern Arizona will consist almost entirely of cutover areas in two or three years, the preservation of seed trees and reproduction becomes of great importance. The insect control measures which should be instituted for the maintenance of a future stand upon these cutover areas fully warrant the employment of the services of an insect control man. The annual toll of pine, taken from these areas is so non-spectacular and insidious that it is seldom noticeable even to a forest officer. Many of the barren wastes are due to these insect depredations, continuing over a long period of years.

In the Prescott Forest, killing of small patches of reproduction around fresh cuttings was very noticeable, but the most spectacular infestation was that occurring around the edges of the burn of 1916, at Crown King, where the unburned timber was and has been almost

free from infestation for several years.

In northern New Mexico infestations were decidedly epidemic on cutover areas, whereas virgin timber was comparatively or decidedly free from infestation. This is best illustrated by the number of counted infested trees in five small tributaries of the Rio Pueblo in the Santa Fe Forest as follows:

La Queva---4 trees,
Gallegos,--34 trees,
Tio Mace,--36 trees,
Hondo,-----19 trees,
Indian,----24 trees.

LaQueva was the only one in which very little cutting had been done. The slash has not been burned, the infested trees being all yellow pines. The only infestation of any consequence in Engelmann spruce was on the Santa Barbara Grant where the saw timber had not been cut during the two years subsequent to "tie-hacking". Over 60% of this saw timber is dead or dying, having been killed in the last two years by the Engelmann spruce beetle, Dendroctonus engelmanni. Nearby virgin stands are almost free from infestation.

Practically the same situation exists in the yellow pine areas in the same region. Tie-hacking operations have been followed by heavy infestations which have

killed a large proportion of the trees marked for milling. In areas where the saw timber has been cut following the tie-hacking the infestation still continues.

Just west of Indian Creek (a tributary of the Rio Pueblo) seemed to be the most active center of the infestation, with about 60 trees infested to the secton on cut over land. These seed trees will be a total loss. Control measures on the watershed of the Rio Pueblo are absolutely necessary, but would not be very effective unless under the supervision of a forest entomologist.

The ever present infestation on cut over areas with unburned slash on the Santa Fe Forest and the lack of infestation in virgin stands, (unless contiguous to old cuttings) is so marked as to allow of but one inference, that the epidemic is due to the multiplication of primary bark beetles in slash.

Brush Disposal.

Methods of brush disposal should be determined after a careful consideration of all the factors which would affect the seed trees, advance growth and reproduction left upon the cut over area. Three methods of disposal are employed in Arizona and New Mexico, i.e. piling and burning, scattering, and pulling the tops. The method to be employed in thick stands of Engelmann spruce and Douglas fir is definitely determined by the nature of the stand. The young growth is so dense as to make burning or pulling of the tops out of the question. At the same

time the breeding of Dendroctonus species and other injurious bark beetles in the slash in enormous quantities is almost sure to follow, as evidenced by the epidemics in the Santa Fe National Forest on cut over areas of Engelman spruce. Any mature timber left on an area is almost sure to be destroyed by bark beetles. As the reproduction and advance growth is amply sufficient to insure a future stand, I would suggest a definite policy of cutting all-commercial timber, scattering the brush and the establishment of permanent fire lines. The injurious bark beetles attacking these species, confine their attacks pretty generally to timber over 12" D.B.H.

In the yellow pine (Pinus ponderosa) areas, however, the situation is entirely different. The stand of timber is so generally open that any of the methods of brush disposal can be employed.

Pulling of Tops.

The advantages of this method seem to be entirely disproportionate to the disadvantages. In fact the benefit to a cut over area has never been definitely demonstrated except the immediate cheapness of the operation which is more or less self evident. In the long run, however, the subsequent loss of seed trees due to the breeding of bark beetles (especially where Dendroctonus ponderosae exist) in these pulled tops, makes it the most expensive of all

the brush disposal methods. The liability of crown fires on a "pulled top" area is a factor worthy of serious consideration, and exists over a long period of years.

The advantage of added humus from the rotting of the tops is infinitisimal, the protection and increase of reproduction has never been definitely proved, while the fire menace is very evident and the resultant loss from infestation is serious.

Scattering.

The reason for this method of brush disposal is rather hard to realize. The immediate cost of the operation is probably somewhat less than piling and burning and a very small amount of humus in the course of a number of years will be added to the soil, but the fire menace still exists and tops still breed and multiply bark beetles, besides the thousand and one insects injurious to the general health of the forest, which kill tops, individual limbs etc. of the remaining timber stand.

Burning.

Definite results seem to me to be obtainable under this method. Probably the immediate cost is slightly more. We have, however, definitely disposed of the fire menace and, if burned at the proper time, destroyed a large proportion of the bark beetles upon the area, saving both seed trees and reproduction. Fundamentally the timber left upon a cut over area is to provide a future crop. The desire for financial

returns has apparently blinded us and made us lose sight of this funamental principle of silviculture. Our cut over areas are practically left to nature to take care of in the future. We have upset the balance of nature. Only a slight infestation on a cut over area will, year after year, take its toll, the seed trees disappear and the reproduction become decimated and diseased. Our cut over areas must be protected from disease, fire and infestation. Burning of the slash is the only method of brush disposal which will largely accomplish all three objects. It has been stated that burning on the yellow pine areas in Arizona and New Mexico is extremely difficult. I can, however, definitely state that it is easy of accomplishment compared with the forests of California where from 95 to 98% of our brush is burned on each forest annually.

It seems very appropriate to conclude with a quotation from the latest publication by an authority, Mr. J. M. Swaine, Forest Entomologist of the Dominion Dept. of Agriculture. This is from his "Canadian Bark-Beetles", Part 2, Bulletin No. 14, where on Page 24 he says:

"Properly conducted slash burning will almost invariably reduce the amount of this annual loss, and it must be regarded as a most valuable method of insect control".

Milling Operations.

It is noticeable in all National Forests where commercial cutting is in progress that mills cutting continuously where the logs are hauled out of the timbered areas (as in the Lincoln Forest where the logs are hauled to Alamogordo on the desert), or the slabs are burned that infestation decreases. On the other hand mills which stop cutting after one or two years operation or mills which do not burn the slabs have an increase in infestation upon the operation and surrounding areas. In the former case the freshly infested bark is destroyed, while in the latter it is not, and serves to multiply the various species of bark beetles. Providing for mills immediately burning all refuse and slabs in sale contracts is therefore one of the best possible insect control measures.

Summary.

District 3 therefore has not only epidemic conditions of serious magnitude, such as the epidemic on the Rio Pueblo of the Santa Fe National Forest, but endemic infestations taking a steady annual toll, especially from cut over areas. I am recommending the following suggestions:

1. That a forest entomologist be immediately employed and put in charge of insect control.

I believe that any one considered for this position should have entomological training, but most important of all,

should be a forester with forest service experience, who will be able to take a broad silvicultural view of the problem and not a strictly entomological one. There are at least three men in District 5 filling these requirements, who possibly might be transferred.

2. That a general policy of slash and brush burning be established on District 3. The summer wet season is an excellent time to burn the slash at the right time for insect control.

As far as I was able to cover the forested areas of District 3, my observations lead me to conclude that the following problems need the immediate study and control which can only be given by an entomologist continuously on the work. The insect loss is by far the greatest loss to the National Forests of District 3.

1. Control of the epidemic infestation in western yellow pine on the watershed of the Rio Pueblo near Tres Ritos in the Santa Fe Forest. This infestation is caused by Dendroctonus (probably the species ponderosae) and shows every indication of spreading rapidly. Three methods of control should be employed.

a. Cutting and burning the bark and limbs of infested trees.

b. Burning the tops and other slash of the freshly cut material, preferably after the material becomes infested.

c. Requiring all mills to burn the slabs and re-

refuse immediately.

2. Controlling the annual loss to both seed trees and reproduction on the cut over areas in northern Arizona.

3. Devising methods of protecting plantations from June beetles and tip moths.

Other important problems will present themselves from time to time. Sporadic outbreaks should always be watched as they are potential epidemics.

Ralph Hopping
National Forest Examiner.

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Approved:

November 27-1918-

R Keadley
Acting District Forester.